Effect of the supplemented dietary iron in the biological cycle among the adolescent girls

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ABSTRACT

Anemia is primarily a metabolic disorder marked by a progressive decline in the iron content in the blood. It is considered to be silent with no early warning signs. Iron-deficiency anemia is among the most common forms of health hazards in the world and is the 8th primary source of ailment in teenager and woman in emerging states. The negligence of dietary iron has ruined the biological cycle during the reproductive age groups and continues forever till their menopausal ages. It takes days together to replenish the lost iron during menstruation, by the time, the next biological cycle starts. Ultimately the body iron depots, gets diminished. The present study was therefore carried out as a baseline survey to find out the pervasiveness of anemia among 100 adolescent girls, who were supplemented with 50 g of dates (one of the richest source of iron), for a period of 1 month. Analysis of the Hemoglobin (Hb) in blood was estimated by Cyanomethemoglobin method on the 1, 2 and 3 day of menstruation. From our results, the Hb level were found to be 9.3 - 13. 2 g/dl in the control group. After supplementation the increasing levels of Hb (10.6 – 14.8 g/dl) was found to be statistically significant ($p < 0.05$). In youngsters, anemia pilots into a fall in educational concert, it is concluded that adequate nutrient intake in the dietary supplementation helps in reducing the prevalence of anemia in adolescents.

Keywords: Anaemia, Dates, Hemoglobin

1. INTRODUCTION

Anaemia is a major killer in India. It is a result of deficiency of one or more essential nutrients, heavy blood loss, parasitic infections and congenital hemolytic diseases. It cause the bad consequences of human health as well as social and economic development (Selomon Assefa *et al,* 2014). That occurs as a result of high demand for iron during the period of rapid growth (Selomon Assefa *et al.,* 2014).

Two thirds of this is present in blood and the rest is stored in the liver, spleen, bone marrow and muscles (Toteja *et al.,* 2006). One of the main important source of iron is date fruit. In the present study, we have evaluated the pervasiveness of anemia among 100 adolescent girls, who were supplemented with dates.

2. MATERIALS AND METHODS

A study was conducted among girls aged 12 to 23 in KG Chavadi, Coimbatore-105. The sample size of 100 was determined using single population proportion formula. A total of 100 girls in the age group of 12-23 were selected and hemoglobin levels were estimated before and after supplementation with 50g of dates for one month.

Statistical Analysis

The standards were articulated as Mean ±SD. The statistical analysis was carried out by one-way analysis of variance using SPSS statistical analysis program. Arithmetic consequences was measured at $p<0.05$.

3. RESULTS

Table 1 shows the levels of Hb on the first day of their biological cycles. The minimum mean Hb was 9.3 g/dl and maximum levels observed in target group of girls was 13.2 g/dl.

Table 1: levels of Hb on the first day of their biological cycles

Particulars	Minimum Hb level (g/dl)	Maximum Hb level (g/dl)
Basal control values (Before supplementation)	9.3±3.20	13.2±2.31

Table 2 shows the Hb levels and the % increase of Hb were estimated on the 1st, 2nd and 3rd of the menstruation after supplementation.

Table 2: Hb levels and the % increase of Hb

Mean Hb levels	Minimum Hb level (g/dl)	% increase of Hb	Maximum Hb level (g/dl)	% increase of Hb
Basal control levels	9.3±1.21	--	13.2±4.20	--
On Day 1	9.9±2.43	6.46±3.41	14.1±3.24	6.82±3.65
On Day 2	9.7±3.43	4.30±3.54	14.0±3.54	6.06*±3.54
On Day 3	10.8±3.21	3.22±4.12	14.8±2.38	4.54*±3.24

*statistically significant $p<0.05$

4. DISCUSSION

Iron is also necessary for growth, development, normal cellular functioning, and synthesis of some hormones and connective tissue (Aggett, 2012). Iron helps make up many proteins and enzymes in our body, helps transport oxygen through your body and is used for regulating cell growth and differentiation. Measurement of hemoglobin level helps to diagnose the extent and severity of anemia, polycythemia as well as other diseases of red blood cells. The current report illustrates the scale of anemia (37.6%) is considered as a moderate public health problem according to WHO 2001. The minimum mean Hb was 9.3 g/dl and that of maximum levels observed in target group of girls was 13.2 g/dl. During adolescent period, the risk of iron deficiency and anemia among boys and girls appears to be more due to growth spurt and in girls it remains as such during their reproductive life (Kanani and Poojara, 2000). There was increase in the mean Hb in the experimental period. A similar increasing trend in the levels of Hb was observed on the day 1, 2 and 3 of the

menstruation. However, the increase was found to be statistically significant ($p < 0.05$) after the supplementation on the 2 and 3 day of menstruation. There were marginal differences in prevalence of anemia and mean Hb in relation to Day 1 which were not statistically significant. Anemia has a serious negative impact on growth and development during adolescent and decreases the ability to concentrate and learn. Iron deficiency was shown to be associated with impaired cognitive process in adolescents as suggested by improved performance following supplementation (Khanduri *et al.,* 2007).

5. CONCLUSION

In spite of the fact that anemia is a preventable condition, it is highly prevalent among the adolescent in all over India, as from the last ten years much focus has been given on adolescent girls. From our results, it is concluded that adequate nutrient intake either in the dietary supplementation or the form of balanced diet and education will surely help in reducing the prevalence of anemia.

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Peer-review

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Conflict of Interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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